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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/650,197	08/26/2003	Robert E. Fields III	S-100,576	6269
35068	7590	02/10/2006	EXAMINER	
UNIVERSITY OF CALIFORNIA LOS ALAMOS NATIONAL LABORATORY P.O. BOX 1663, MS A187 LOS ALAMOS, NM 87545			ONEILL, KARIE AMBER	
			ART UNIT	PAPER NUMBER
			1746	

DATE MAILED: 02/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/650,197	<b>Applicant(s)</b> FIELDS ET AL.	
	<b>Examiner</b> Karie O'Neill	<b>Art Unit</b> 1746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 26 August 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>8-26-03</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claim 1-3, 5-6 and 9-12 are rejected under 35 U.S.C. 102(e) as being anticipated by Iwase (US 6,656,618 B2).

With respect to Claims 1-3 and 5, Iwase discloses in Figure 1, an apparatus for controlling a fuel cell power system having a fuel cell stack (36) with a connected energy storage medium (40), comprising:

A voltage monitoring circuit (20d) connected to monitor individual voltages from one or more individual fuel cells forming fuel cell stack; a regulating circuit (20-CPU) with said individual voltages as input, and outputting a control signal to regulate said fuel cell stack output voltage about a predetermined setpoint; a first DC-DC converter (38)

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connected to said regulating circuit (20) and said fuel cell stack (36), to receive said control signal and outputting a new voltage corresponding to a maximum power that said fuel cell stack can provide and supplying said new voltage to an output bus (46) and said energy storage medium (column 5 lines 28-38), wherein energy storage medium is a battery (column 7 lines 53-54). He also discloses a blocking diode (39) connected between said first DC-DC converter and said output bus (46) to prevent reverse electrical current flow from said output bus into said first DC-DC converter (column 7 lines 50-52). Iwase also discloses a DC-AC inverter (44) connected between said energy storage medium (40) and said output bus (46) for receiving a variable voltage from said fuel cell power system and providing a constant AC output voltage to said output bus (column 8 lines 15-18).

With respect to Claims 6 and 9-12, Iwase discloses in Figure 2, a method for controlling a fuel cell stack with a connected energy storage medium, comprising: monitoring one or more individual fuel cell voltages within said fuel cell stack with an individual cell voltage monitor (part of the CPU); setting a stack voltage setpoint within a regulator circuit (CPU) for operating said fuel cell stack at a maximum power output (column 9 lines 39-42); modifying said voltage setpoint to a higher voltage which is varied with a variation in flow rate of the gaseous fuel flowing into the fuel cells (column 9 lines 27-29); and controlling a DC-DC converter connected between said fuel cell stack and said energy storage medium with said regulator circuit (CPU) to maintain a regulated voltage output to an output bus corresponding to said maximum power output (column 11 lines 4-7 and step S28). Iwase discloses in steps S24-S46 in Figure 2, the

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step of monitoring the operation of the cell voltage monitor in the CPU and increasing or decreasing the said stack setpoint voltage when it is determined that the highest energy conversion efficiency is less than zero or greater than zero and the output of electric energy by the fuel cells is in excess or the electric output of the cells is not sufficient and not capable of supplying the power required to the output bus (column 10 lines 4-29).

He also discloses monitoring the said regulated voltage output of the DC-DC converter in Figure 2 step S20, and decreasing the voltage output of said DC-DC converter when it is determined that the fuel cell stack is loaded beyond said maximum power output (column 11 lines 27-31 and steps S24-28) and increasing the voltage output of said DC-DC converter when it is determined that the fuel cell stack is not at maximum power output (column 12 lines 35-49 and steps S42-46).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Iwase (US 6,656, 618 B2) in view of Rajashekara (US 6,321,145 B1).

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Iwase discloses the apparatus for controlling a fuel cell power system in Claim 1 above, but does not disclose a second DC-DC converter connected between said energy storage medium and said output bus for receiving a variable voltage from said fuel cell power system and providing a fixed DC output voltage to said output bus.

Rajashekara discloses in Figure 3 and column 8 lines 63-65, a second buck/boost converter (62) located between an energy storage medium (60) and an output bus (12) for receiving voltage from the fuel cell system, which powers the system through the output bus.

Iwase and Rajashekara are analogous art because they are from the same field of endeavor, fuel cells. At the time of the invention it would have been obvious to one of ordinary skill in the art to add a second DC-Dc converter as in the Rajashekara reference to the fuel cell power system of Iwase in order to match the DC electric voltage needed to properly supply the output bus and keep a constant voltage supplied to it.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Iwase (US 6,656, 618 B2) in view of (Fuglevand 6,497,974 B2).

Iwase discloses the method steps of Claim 6 above, but does not disclose the step of monitoring operation of said individual cell voltage monitor, and resetting the voltage setpoint when it is determined that said individual cell voltage monitor is not functioning properly.

Fuglevand discloses in column 13 lines 38-52, error processor circuitry that is coupled in voltage sampling to the output of the individual cells and compares the actual output of the voltage to the desired and set output voltage and makes appropriate adjustments when the voltage is not proper.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to be able to monitor the individual cell voltage monitor to determine if the voltage monitor was working properly, as in the Fuglevand reference, and to have it reset itself or make the appropriate adjustments when it is not working properly so as to not run the fuel cell system at incorrect voltages and to help ensure the maximization of fuel cell life expectancy and fuel cell performance (column 13 lines 5-6).

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over lwase (US 6.656, 618 B2) in view of Bourilkov et al. (US 2004/0174072 A1).

lwase discloses the method steps of Claim 6 above, but does not disclose turning off the DC-DC converter when it is determined that the fuel cell stack is experiencing low cell voltage that could damage the fuel cell stack.

Bourilkov et al. discloses in paragraph 0044, that the DC-DC converter will stop operating a certain minimum voltage and at that time the activation for regeneration of the fuel cell stack will occur.

lwase and Bourilkov et al. are analogous art because they are from the same field of endeavor, fuel cells. At the time of the invention it would have been obvious to

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one of ordinary skill in the art to use the DC-Dc converter method step of Bourilkov et al. with that of Iwase so as to stop the flow of voltage to the fuel cell stack so as not to damage the stack and allow the stack to have to regenerate.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karie O'Neill whose telephone number is (571) 272-8614. The examiner can normally be reached on Monday through Friday from 8am to 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Barr can be reached on (571) 272-1414. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KAO

  
**JONATHAN CREPEAU**  
**PRIMARY EXAMINER**